



**APPLICATION**  
**FOR**  
**UNITED STATES LETTERS PATENT**

**Title : FORCE PROTECTOR FOR  
PALLET RACK SYSTEMS**

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**FORCE PROTECTOR FOR  
PALLET RACK SYSTEMS**

**Reference:** The information, data and all benefits of provisional application No. 60/428,927 filed 02/04/2003 are incorporated by reference into this description.

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**BACKGROUND OF THE INVENTION**

**Field of the Invention.** The present invention, generally, relates to warehouse storage arrangements and systems for pallet racks of multiple heights and depths accessible by forklift trucks and, more particularly, to a protector for such pallet racks from the force of an impact by the forklift trucks.

**Background of the Invention Field.** The advances in warehouse storage systems in today's markets is remarkable. These advances are from a simple back room where boxes of supplies were stacked - to today's huge warehouses with multiple sections of racks extending across an allotted space in a warehouse to support pallets two and three deep.

A section in a pallet rack storage system includes vertical columns to support rails on which carts carry pallets that can be retrieved, one by one, from an aisle by, for example, a forklift. Much attention has been devoted in developing very clever "push-back" cart storage systems, many are in use today, and many are damaged by forklifts.

In the past when it became evident that the upright members of these cart storage systems were being damaged by the forklifts, studies revealed that it was not caused by careless operators of the forklifts, but rather, operating care, it seemed, did not avoid an occasional encounter with these upright members.

Damaged file systems caused costly delays in obtaining access to parts, material and whatever was stored. These costs have lead to some very clever force absorbing arrangements proposed to overcome the devastating results, or to avoid the damage altogether.

#### **OBJECTS AND SUMMARY OF THE INVENTION**

It is an object of the present invention to provide a force-absorbing device, that current plans include test marketing under the trademark, "*Loran Device*", that are being tested and already have proved to work well.

Another object of the present invention is to provide a device for attaching to the upright legs of storage racks that are

usually accessed by forklift trucks to prevent damage to the racks when encountered by a forklift truck.

Briefly, a device that is constructed and arranged according to the present invention includes at least two surfaces to fit adjacent an upright part of a structure to be protected from an external force encountering the structure. The device includes a fixed surface located a distance from the upright leg and includes resilient means supported intermediate said structure and said surfaces. The external force that is directed at said upright part is at partially intercepted by said surfaces and at least partially absorbed by said resilient means.

The above and other objects and advantages of the present invention will become more readily apparent from a more detailed description to follow taken in conjunction with the drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a top view of the device of the present invention as an aid in describing the details of its construction and operation.

FIGURE 2 is a rear view of the device constructed in accordance with the present invention as a further aid in its description.

**FIGURE 3** is an illustration indicating how the device of the invention is located on a leg of a storage rack.

**FIGURE 4** is an illustration of a multi-level storage rack as an aid in describing one use of the device of the present invention.

#### **DETAILED DESCRIPTION OF THE INVENTION**

Referring first to **FIGURE 1** of the drawings, the view of the protector device 10 is looking down from above. The device is a protector that will protect any structure but, for the purposes of describing its arrangement and function, will be described as being for protecting the upright support leg of a storage rack that faces the traffic of forklift trucks in the isles to access the racks.

An outer surface 11 is formed in a generally "V" shape, as indicated at 12 and 13, with opposite sides 14 and 15 forming a space to fit around the structure to be protected. A plurality of resilient springs 16, with ends 17, are located to fit intermediate an upright portion of the structure to be protected and a panel 18 that is welded, as indicated by the reference numbers 19 and 20.

The panel 18 is fitted against a panel 25 approximately midway between the springs 16. The panel 18 and the panel 25 are welded at 21 and 22 to produce a maximum support for the springs 16. The ends 17 of the springs 16 fit against the upright portion of the structure to be protected.

The generally "V" configuration, or arrangement, of the outer surface 11 will deflect a blow from, for example, a forklift truck that would hit the pallet rack upright support leg. While the material from which the device is constructed can vary depending upon the size of the force expected, to protect an upright support leg of a storage rack, 3/16 inch sheet metal that is 48 inches wide and 96 inches long has been found entirely satisfactory.

After the side panels are formed, the elongated openings indicated by the reference numbers 23 and 24 are formed in the side panels 14 and 15 for attaching the device to the upright support leg in a desired location. The configuration of these openings 23 and 24, better seen in Figure 3, provides a safety feature for the device 10 of the present invention.

When the springs are nearly compressed completely, having about 3/16 inch remaining, the elongated configuration of these slots permits an additional safety feature. While a forklift traveling at 4 mph hit the protector 10 during a test, no damage was evidenced to a frame being tested.

There are conditions that could possibly affect the characteristics of the springs, and they will be described in more detail in hereafter. An example would be when a forklift truck to be used is bigger and more powerful, perhaps with an inexperienced driver, it could be expected that an impact will be more forceful, and a heavier spring will be selected.

However, more frequently the forklift drivers are experienced and careful in their operation in pallet rack areas. Therefore, by far a spring of customary stiffness is entirely effective, and tests that have been made with the protector device in place and an inexperienced fork lift driver maneuvering between racks failed to produce serious damage.

The springs must be of sufficient resilience to, at least partially, absorb such a force expected to be encountered. Each spring, therefore, is formed from 3/16 inch bar stock material.

The sloping surfaces 12 and 13 will partially deflect such a force, and these springs will absorb any remaining force. It is this combination of the resilient means and the sloping surfaces that provide a maximum protection.

FIGURE 2 of the drawings shows the rear of the protector device with four springs to absorb a blow. The ends 17 of the springs facing the viewer are located against a structure to be protected and the opposite ends against a panel 18 welded to the outer surface, as described hereinabove.

FIGURE 3 and FIGURE 4 are included only to illustrate the environment in which the force protector of the present invention is anticipated to be particularly useful. Each of these views do not require a detailed description in that they are clear as shown.

The invention has been shown, described and illustrated in substantial detail with reference to presently preferred forms of the invention. It will be understood by those skilled in this art that various changes and modifications may be made without  
5 departing from the spirit and scope of the invention which is defined by the appended claims.

What is claimed is: